Short report

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Trisomy 3 mosaicism in a patient with Bartter syndrome

The diagnosis of Bartter syndrome was established in a 21 year old female patient, who presented with hypokalaemia and hyperkaluria, alkalosis, hyperreninism, hyperaldosteronism, and decreased fractional chloride reabsorption in the ascending limb of Henle's loop.

Her stature was very short (140 cm) with otherwise normal body proportions. At birth, a coloboma of the right eye, dislocation of the left hip, and syndactyly of the second and third toes of the right foot were present. Since the age of 13, she has suffered from recurrent attacks of gouty arthritis. At the age of 20, she presented with hyperglycaemia and glucosuria for which she had received insulin for one year. Family investigations revealed consanguinity between the parents (F=1/256).

Karyotyping was first performed at the age of two, and showed trisomy 3 in 10% of leucocytes. At the age of 21, another cytogenetic evaluation was performed which revealed mosaicism for a normal and a trisomic cell line. In cultured blood leucocytes, a 47,XX,+3 karyotype was found in the majority of mitoses. In all cultivated skin fibroblasts, however, the karotype was 46,XX.

Whether there is a causal relationship between trisomy 3 and Bartter syndrome is unknown. This association has not been reported before.

Trisomy 3 is very rare in liveborn children. A case of trisomy 3 mosaicism was reported in a female baby who presented with severe failure to thrive and died at the age of five months.[1] She had a 47,XX,+3 complement in leucocyte cultures, but showed a normal 46,XX karyotype in skin fibroblasts. The baby had a large skull, low set, malformed ears, and glaucoma. A second case of trisomy 3 mosaicism (95% 46,XX and only 5% 47,XX,+3 in lymphocytes) was reported by Therman[2] in a 30 year old mentally retarded woman with multiple anomalies.

The consanguinity between the parents of the present patient suggests homozygosity of a recessive gene as a possible cause for the Bartter syndrome, which is recognised to be an autosomal recessive disorder.[3] On the other hand, the possibility remains that the trisomy enhances the action of a protein coded for by a gene on chromosome 3. About 30 genes have been mapped to this chromosome. However, none of them is known to be related to Bartter syndrome. The short stature and the congenital abnormalities could, however, be connected with the trisomy 3 and the same is true for the coloboma and the hip dislocation. The mild clinical dysmorphism in this patient can be explained by the chromosomal mosaicism. Finally, as the patient is not mentally retarded, the trisomic cell lines apparently did not greatly affect the psychomotor development.

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